



2017 Alfalfa Winter Kill Factors

As spring approaches each year, it is important to pay attention to your alfalfa fields as they begin to green up and grow. It is time to look for signs of “winter kill”. Winter kill is the generic term used to describe death of an alfalfa stand from fall through spring. However, the name is misleading, because most stand death happens during the spring. There are many reasons why alfalfa dies out over the winter and in the early spring. This year we have more factors working against the alfalfa than normal. I’ll provide a recap of the conditions alfalfa stands have faced in the Northern US starting last fall that give me cause for concern this year when inspecting your alfalfa stand for winter kill.

- **Cool and Wet Fall in 2016:** Our warning signs started last fall with saturated soils in many areas for a prolonged time which puts the alfalfa roots in an oxygen deficit. Then, the soils froze in December. Then we had a brief warm up that added more water from the melting snow and rain that caused ponding water in the lower areas which then froze again. If the water was deep enough to cover the crowns and stems that were left, then there is a good chance that some plants died at that time.
- **Warm and Wet February in 2017:** Currently in many of the areas in the Legend Seeds footprint, February experienced a record warm up and melted the snow cover we had and added even more puddles to the fields which will refreeze adding to the stresses already there from the fall.
- **Early March Warmup in 2017:** The danger with losing our snow cover in early spring is that the alfalfa plants are now exposed to the warming temperatures. In just as few as three days of temperatures in the upper 50s and low 60s alfalfa can break dormancy and start growing. This is particularly true with alfalfas that have a fall dormancy rating of four and higher. If alfalfa breaks dormancy too soon it can be severely injured and killed by the freezing temperatures. In eastern Wisconsin, there were fields that had 6-8 inches of new spring growth in March before the weather turned back to the multiple nights near zero with below zero windchills. This may have killed these fields and they will need to be watched very closely as the weather warms up again in late March and early April.
- **Late April frost in 2017:** Even a few hours of temperatures below 28° F can be enough to kill any new growth back to the ground level, forcing the plant to start over. We experienced this in parts of South Dakota and Minnesota on April 26, 2017. For example, De Smet, South Dakota was 27° F and Hitterdal, Minnesota was 24° F. Normally, we could have expected a first cutting between mid to late May. These cold temperatures will likely set that back seven to ten days, depending on the weather we have going forward.

- **Crowns & Taproot Concerns:** A second form of winter kill is having the crowns heaved or pushed up out of the soil (shown at right). When there is more than a half-inch of exposed root below the crown, then there is a very high probability that the taproot has been severed and the alfalfa plant will die shortly after greening up in the spring. Sometimes, the taproot gets severed deep enough that the plants will yield close to normal initially, but when cut for the first time the stand will never green up again.



- The final risk factor is one that we don't have to worry about in the spring of 2017. The general rule is that a prolonged soil temperature of 15° F at 3-inches deep will kill alfalfa. There has been sufficient snow cover through the coldest part of winter across the Legend Seeds footprint to protect the plants from low temperatures, so this is not a concern in our northern region this year.

Rotate or Leave it?

The decision to rotate a field can be hard to make with the irregular patterns of dead areas. The rule of thumb is rotate if the field falls below the average of 40 stems/square foot. I recommend using a larger size hoop than the simple 1-foot squares that are often available and used. A larger circle will give you a better representation. Be sure to sample several areas of the field until you feel comfortable with the numbers you are collecting. If you have questions or would like help in this decision-making process, please contact your local Legend Seeds representative for guidance.

Examples of winter kill from ponded water:



Example of winter kill from cold soil temperatures:



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